



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,525	03/08/2002	Keishiro Okamoto	020214	3829

23850 7590 06/04/2003

ARMSTRONG, WESTERMAN & HATTORI, LLP  
1725 K STREET, NW  
SUITE 1000  
WASHINGTON, DC 20006

EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicant No.

10/092,525

Applicant(s)

OKAMOTO ET AL.

Examiner

Samuel A Gebremariam

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of group I, claims 1-14 drawn to a semiconductor device in Paper No. 4 is acknowledged.

### ***Specification***

2. The disclosure is objected to because of the following informalities: throughout the specification the word "filles" is spelled wrong. Appropriate correction is required.

### ***Claim Objections***

3. Claims 1-5 are objected to because of the following informalities: the numbering of the claim lines appears to be wrong.

The word "filles" is spelled wrong though out claims 1-14. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of claim 1 is unclear because the term "pitch" is not specifically defined as to what it refers to. Is it related to the width, thickness or length of the through holes or wires. Furthermore the sentence "having terminals in conformity with

Art Unit: 2811

the second pitch" is not clear what it means. What does conformity with either first or second pitch mean?

The scope of claim 10 is unclear because it is not clear which insulating layer is applicant referring to. Is applicant referring to the silicon oxide layer or is it another layer?

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 1-5, 7-9, and 11-14 in so far in compliance of 35 U.S.C. 112 and as best understood by the examiner are rejected under 35 U.S.C. 102(e) as being anticipated by Kazuaki et al., JP patent No. 2002-008942.

Regarding claim 1, Kazuaki teaches (figs. 1-9) a semiconductor apparatus, comprising: a support substrate (10) having through holes (fig. 1, 12a, 12b) fills with conductor in conformity with a first pitch, capacitors (30, 30a, 30b and 42) formed on the support substrate (10), a wiring layer (21b) formed on the support, leading some of the through holes fills with conductor upwards via the capacitor, having branches, and having wires of a second pitch (21b, have different thickness than 12a or 12b) different from the first pitch, and semiconductor element (44, fig. 9) disposed on the wiring layer

(21a), having terminals (38a, 38b) in conformity with the second pitch, and connected with the wiring layer via the terminals.

Regarding claim 2, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including a circuit board (46) having wiring of a first pitch and connected to lower surfaces of the through holes fills with conductor.

Regarding claim 3, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the second pitch is narrower than said first pitch.

Regarding claims 4 and 5, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the support substrate is a Si substrate (10) having through holes (12a, 12b and 12c) with an insulation film formed on the side walls of the holes, and the through holes fills with conductor are metallic conductors packed in the through holes.

Regarding claim 7, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the capacitor is a decoupling capacitor connected between power (refer to the English translation, page 2 last paragraph) wires, and the wiring layer has branches between the decoupling capacitor and at least one of the semiconductor elements (44).

Regarding claims 8 and 9, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the through holes fills with conductor include a first signal wire (28c); the wiring layer contains a second signal wire for leading the first signal wire substantially vertically; and the capacitor has electrodes (14 and 18) with a vacancy (region inside 30) around a region where the second signal wire is located.

Regarding claims 11 and 12, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the capacitor has a capacitor dielectric layer made of an oxide containing at least one of Ba, Sr and Ti, (English translation page 7<sup>th</sup> paragraph) and a pair of capacitor electrodes sandwiching the capacitor dielectric layer and containing at least partially one of Pt.

Regarding claim 13, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the wiring layer contains a wiring connecting the plural semiconductor elements with each other.

Regarding claim 14, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including another circuit part connected with said wiring layer.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuaki.

Regarding claim 6, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above including the insulation film is a silicon oxide film.

Kazuaki teaches (page 3, 3<sup>rd</sup> paragraph) that a silicon oxide layer is formed on the substrate (10).

Kazuaki does not explicitly teach that the silicon oxide film is formed by thermal oxidation, and upper and lower surfaces of the silicon substrate are also covered with a silicon oxide film.

With regard to the limitation that the silicon oxide film is formed by thermal oxidation, this is considered a product-by-process claim. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 10, Kazuaki teaches (fig. 9) the entire claimed structure of claim 1 above except explicitly stating that the insulation layer disposed on the support substrate, have a thermal expansion coefficient of 10 ppm/°C or less in the in-plane direction, and insulates the wiring layer and the capacitor.

### ***Priority***

9. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References A and B are cited as being related to packaging.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Samuel Admassu Gebremariam  
May 30, 2003

Steven Loh  
Primary Examiner  
*Steven Loh*